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# PATENT SPECIFICATION

DRAWINGS ATTACHED

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## COMPLETE SPECIFICATION

### Improvements in or relating to Seat Back-rests

I, JOHANN SCHWARZ, of German nationality, of 12, Rheinallee, Leverkusen, Germany, do hereby declare the invention for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to seat back-rests.

The methods hitherto followed of constructing seats in general, and in particular seats in a motor vehicle (above all the driver's seat), give the seated person little chance of adopting a seated position which is conducive to health. As a rule, the back-rests of such seats are extremely well upholstered. Even good upholstering, however, does not assist the seated person to adopt an anatomically correct seated position, since the upholstery yields and the seated person is thus enabled to adopt any seated position which appears to him to be comfortable but which is not, however, conducive to health. Also auxiliary means, such as for example auxiliary rest means adapted to be disposed before the back-rest, have not resulted in real improvement.

An object of the invention is to devise a back-rest, in particular for the driver's seat of a motor vehicle, wherein the seated person is given improved support and is "encouraged" to take up a healthier seated position.

According to the present invention there is provided in or for use in the back of a seat, a backrest comprising a support member for supporting the small of a person's back, a mounting from which said support member is suspended for securing said support member in position in the back of said seat, and means for adjusting the position of said support member vertically relatively to the back of said seat and for adjusting the position of said support member with respect to the depth of the seat.

The support member, which may be

formed by a plate, may be connected to the mounting by a retaining member constituted by a flat spring the upper end of which engages in a recess in the mounting and is adapted to be inserted, with the aid of bolts, in transverse stop means, the support means being preferably so mounted on said retaining member as to be movable on all sides. It is possible to provide a plurality of stop means one below the other, so that the retaining member can, as required, be inserted in a transverse stop means of this sort at different heights. Pivotability of the leaf spring may be achieved by means of a screw bolt adapted to be screwed into a sliding block which is displaceable in a longitudinal slot formed in the mounting. The free end of the screw bolt acts on the leaf spring. Depending on the depths to which the bolt is screwed in, the leaf spring and with it the plate articulated thereto are adjusted in the direction of the depth of the seat.

According to a further embodiment, the retention and guiding of the leaf spring in the mounting can be effected by causing a bent-over portion of the spring to engage, by means of lateral notches, in a recess formed in the mounting. When the flat spring is pivoted in the direction of the seat depth, clamping-fast on the edges of the recess in the mounting takes place. Further securing of the leaf spring in the vertical direction can be achieved by clamping the sliding block fast. This clamping fast can be achieved by means of the pressure exerted by a spiral spring or, directly, by the tightening of a nut provided with a handhold.

This form of adjustable arrangement for the retaining means for the plate or the like for supporting the small of a seated person's back has the advantages of simplicity and easy adjustability. The arrangement is such that the retaining means can also be easily removed or interchanged, so that the back-rest can be used or not used as desired. Fur-

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thermore, the construction can be such that the entire seat back-rest device can quite easily be subsequently fitted on to already-available seats. The device itself consists of

5 relatively few elements and is strongly built.

The adjustment of the retaining means with the back-supporting plate can also be designed in such manner that there is provided between the lateral limbs of the back of a seat a slidable cross-member carrying the plate which is for example vertically adjustable by means of rollers or balls. A suspension of the cross-member on springs can be effected in such manner that the cross-member rolling on the limbs is held in a central position by means of the springs.

For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made to the accompanying drawings in which:

20 Figure 1 is a rear view of a seat back-rest embodying the invention,

Figure 2 is a side view of Figure 1, partly in section along the line II—II of Figure 1,

25 Figure 3 is a rear view of a modified detail of Figure 1,

Figure 4 is a section along the line IV—IV of Figure 3.

30 Figure 5 is a view of a detail of Figure 3 in the direction of arrow V,

Figure 6 is a modification of the detail shown in Figure 4,

Figure 7 is a further modification of the detail shown in Figure 4,

35 Figure 8 is a front view of the mounting for the arrangement shown in Figure 7,

Figure 9 is a front view of a seat incorporating a seat back-rest also embodying the invention,

40 Figure 10 is a side view of Figure 9,

Figure 11 is a section on the line XI—XI of Figure 9,

45 Figure 12 is a rear view of a seat fitted with another modified form of seat back-rest in accordance with the invention,

Figure 13 is a section taken generally down the middle of Figure 12, and

50 Figure 14 is a rear view of a seat fitted with yet another form of seat back-rest in accordance with the invention.

In the drawings, corresponding parts have been given the same reference numerals. In the several embodiments, the back-rests comprise support means arranged to be positioned at the level of the small of a seated person's back and adapted resiliently to support the back at the level of the small of the back, the support means being preferably movable on all sides in a retaining means 2, for example with the aid of a ball and socket joint. The pivotability of the support means in the direction of the seat depth is achieved by suspension of the retaining means with simultaneous mounting and adjustability in the upward direction and in the

direction of the depth of the seat.

In the embodiment according to Figures 1 and 2, the retaining means comprises a leaf spring 2 carrying, at its lower end 3, a plate 1 and, at its upper end, a free-standing pin 4 preferably projecting towards both sides. This pin serves as a swivel pin and is adapted to be inserted in prepared transversely-extending grooves 6 in the transverse portion of a mounting 5. The mounting 5 engages about a transversely-extending tube 7 of the frame of the back of the seat and is secured to the tube by means of bolts 8 which pass completely through the tube. In the constructional example illustrated, there are three grooves 6, disposed one below the other, for inserting the free ends of the pin 4. As required, it is possible to provide also a larger number of grooves 6, which are then arranged closer together.

The adjustment of the leaf spring 2 in the direction of the depth of the seat is effected by means of a screw bolt 9 which may carry a screw provided with a handhold 10. The bolt 9 is screwed into a sliding block 11 which is displaceable in a slot 13 adjoining the recess 12 in which the upper portion of the leaf spring 2 engages and is guided. The sliding block 11 is formed outwardly with a flattened portion 14 which engages with the edges of the slot 13. The free end of the screw bolt 9, formed as a pin head 9a, engages in the leaf spring 2, so that the latter is, when the screw bolt 9 is adjusted, pivotal in the direction of the depth of the seat. The vertical position of the leaf spring 2 and therewith of the plate 1 is secured due to the fact that the swivel pin 4 engages in a groove 6. The engagement between the pin head 9a and the leaf spring provides a certain degree of pivotability of the elements relatively to one another.

In the constructional example according to Figures 3—5, the attachment 15 is securely connected to the frame tube 7, for example by welding. A leaf spring 2a has, at its upper end, a bent-over portion 16 formed with recesses 17. The bent-over portion 16 engages in the recess 12a in such manner that the wall of the attachment 15 engages in the recesses 17. The lateral edges 17a of the recesses 17 can have knife-edge form. A screw bolt 9b is screwed into a sliding block 11a and is pivotally connected with the leaf spring 2a in the same manner as with the example illustrated in Figures 1 and 2. The sliding block 11a has a rotation-inhibiting means in the form of a flattened portion 18 bearing against an abutment strip 19. The sliding block 11a engages in a recess 20, the shape of which determines the position of three vertical adjustments. With the aid of a compression spring 21, the sliding block 11a is retained in a circular portion of the recess 20. The release, for the purpose of

vertically adjusting the leaf spring 2a, is effected by pressing in the knob 10 against the action of the spring 21, until the sliding block 11a has emerged from out of a circular recess 20. Then, the element concerned can be pushed upwardly or downwardly until the central portion 11b snaps into another circular recess 20.

Instead of a spring 21, it is also possible to use a nut 22 provided with a handhold (Figure 6), the said nut being screwed on to an outer thread of the sliding block 23. The knob 10 or the pin 9c is mounted in the block 23 in such manner as to be merely pivotal but not longitudinally displaceable thereon. The pin 9c is provided with a screw bolt 24 screwed into a nut 25 securely connected to the leaf spring 2.

In the constructional example illustrated in Figures 7 and 8, the knob 10 is also mounted in a sliding block 26 in such manner as to be pivotal but not longitudinally displaceable therein. It has a screw-threaded bore 27 in which engages a screw bolt 28 connected with the leaf spring 2. By rotating the knob 10, the bolt 28 is screwed out to a greater or lesser degree for the purpose of adjusting the leaf spring 2.

The securing of the adjustment device for the supporting plate in the bowed frame 7 of the seat is, in this embodiment, made interchangeable. The attachment 29, upon which the leaf spring 2 is mounted for longitudinal displacement, and upon which the adjustment device 10, 22, 28 is arranged, is inserted, with the aid of a pin 30, in a bore formed in the transversely-extending portion of the bowed member 7. Secured on the lower end of the attachment is a tube 31 wherein a further tubular element 32 is adapted to be displaced in telescopic manner. The tubular elements 31 and 32 engage, with the pins 33 and 34 provided at their outer ends, in the limbs 7a. The telescopic tubes 31 and 32 can be secured in position relatively to one another by a screw means 35, so that the back rest mounting is held fast at three points in the seat frame.

Figure 14 shows diagrammatically another form of back-rest mounting the limbs 7a of which are free at their upward ends and are not transversely connected together. In this case, attachments 29a are directly connected to the limbs 7b. The said attachments 29a are constructed in the same manner as the element 29, and the leaf spring 2a corresponds to the leaf spring 2 shown in the other Figures. The back plate 1a is, in the present embodiment, held by two leaf springs 2a.

In a further embodiment illustrated in Figures 9 to 11, vertical adjustment of the plate 1 is made possible by fitting the cross-piece 36, upon which the leaf spring 2 is suspended, in displaceable manner on the limbs 37 of the back-rest frame. For this purpose,

the cross-member 36 can be provided with rollers 38 (Figure 11) surrounding the limbs 37. The cross-member is held at a specific height by means of compression springs 39. In order to be able to adjust the height of the back-rest itself, it is possible also to provide a U-shaped frame 40 engaging round the limbs 37 and being also slidably displaceable thereon by means of rollers 41. The springs 42 hold the frame 40 at a specific height. In place of coil springs, it is also possible to use rubber assemblies as spring elements.

As apparent from Figure 10, the plate 1 has an arcuate form. It can, for its part, be covered with upholstery 1a. It is disposed within the covering or upholstery 43 of the back-rest.

In the constructional example illustrated in Figures 12 and 13, there is provided on the limbs 7a of the seat frame a transversely-extending support means 44 adapted to engage around the limbs 7a by means of the ties 45. The support member 2 is articulated in suspended manner to this transversely-extending element 44, the upper portion of the support 2 engaging through an aperture 46, with the bent-over portion 47 curling over the upper edge of the support means 44. The support plate can be disposed at the lower end of the support means 2. It may consist of a transversely-extending element 48 articulated at 49. The said element 48 carries individual supporting elements 50 which may be rigidly or pivotally arranged on the element 48. The supporting elements 50 will preferably be slightly curved so as to fit the curvature of the small of a person's back. The support device is adjusted by means of a screw 51 screwed into the support means 44, for example in a collar. The screw, with the knob 52, presses against the support means 2 which is rigid but can, however, to a certain extent be resilient.

The illustrated seat back-rests are suitable not only for use on motor vehicle seats, but can also be used on conventional chairs or other seats, for example on office chairs.

#### WHAT I CLAIM IS:—

1. In or for use in the back of a seat, a back-rest comprising a support member for supporting the small of a person's back, a mounting from which said support member is suspended for securing said support member in position in the back of said seat, and means for adjusting the position of said support member vertically relatively to the back of said seat and for adjusting the position of said support member with respect to the depth of the seat.

2. A back-rest as claimed in Claim 1, wherein the support member is formed by a plate, said plate being suspended from the mounting through the intermediary of a leaf spring, said adjusting means comprising a re-

cess formed in the mounting and through which extends the upper end portion of the spring, a plurality of pairs of grooves formed at different levels in the side of the mounting opposite the plate and adjacent said recess, a pin provided at the upper end of the spring and extending transversely thereto, the end portions of the pins being adapted selectively to engage any one pair of grooves to form a hinge-like connection between the spring and the mounting and to enable the plate to be moved vertically relatively to the back of said seat, said adjusting means further comprising a block slidably mounted in a slot formed in the mounting below the mounting for vertical displacement, said block being formed with a threaded bore through which is mounted for axial displacement a bolt connected at one end to the spring, so that upon axial displacement of the bolt, the position of the plate can be adjusted with respect to the depth of the rest.

3. A back-rest as claimed in Claim 1, wherein the support member is suspended from the mounting through the intermediary of a leaf spring, said adjusting means comprising a first vertical slot formed in the mounting and through which extends the bent-over upper end portion of the spring, said upper end portion of the leaf spring being formed with lateral notches for engaging the vertical edge portions of said slot, said adjusting means further comprising a second vertical slot formed in the mounting below said first slot, a block slidably mounted in said second slot for vertical displacement therein, and a bolt connected at one end to the leaf spring and extending into or through a bore formed in said block so that, upon rotation of said bolt, the position of said support member with respect to the depth of the seat can be adjusted, means being provided on said block for locking the latter in any one of a plurality of positions in said second slot.

4. A back-rest as claimed in Claim 3, wherein said second slot is formed by a vertically arranged series of merging circular holes, wherein the block is formed with a first cylindrical portion corresponding in diameter substantially to the diameter of the holes and a second cylindrical portion of reduced diameter adjacent said first portion on the side of the mounting remote from the leaf spring so that upon the block being axially displaced towards the leaf spring to disengage said first portion from its retaining hole, the block can be moved vertically to engage another hole, and wherein said block locking means comprises a spring for urging and normally maintaining the first portion of the block in the selected hole.

5. A back-rest as claimed in Claim 3, wherein said block locking means is formed by a clamping unit threaded around said

block to one side of the mounting.

6. A back-rest as claimed in one of Claims 3 to 5, wherein said bolt is connected to the leaf spring pivotally or with play and is controlled at its other end by a handhold located at the end of the block remote from the leaf spring.

7. A back-rest as claimed in Claim 6, wherein the bolt is rotatably mounted but not axially displaceable in said block, said bolt being connected at said one end to the leaf spring through the intermediary of a unit which threadably engages said one end and which is fixed to the leaf spring.

8. A back-rest as claimed in Claim 6, wherein the handhold is rotatably mounted but not axially displaceable in said block, and the bolt is threadably engaged at said other end in a bore formed in said handhold.

9. A back-rest as claimed in any preceding Claim, wherein the mounting is adapted to be detachably secured to a transverse frame member of the back of a seat by means of screws extending through said frame member.

10. A back-rest as claimed in any one of Claims 1 to 5, wherein the mounting is integrally secured to a transverse frame member of the back of a seat, for example by welding.

11. A back-rest as claimed in any preceding Claim, wherein said mounting has the form of an inverted T, the stem of the mounting having suspended therefrom said support member and the cross-arm of the mounting being formed of two telescopically engaging parts, the free ends of the inverted T-shaped mounting being provided with pins for engaging in corresponding openings formed in an inverted U-shaped frame of a back of a seat, means being provided for locking said telescopically engaging parts relatively to one another when the mounting is fitted to said frame.

12. A back-rest as claimed in any one of Claims 1 to 10, wherein the mounting has the form of an inverted U, the limbs of the inverted U-shaped mounting being connected by a cross-member from which the support member is suspended and being mounted for vertical displacement on two upwardly extending members connected to the base of a seat, said cross-member being subjected to the action of a spring, and said mounting and said upwardly extending members co-operating to form the frame of the back of a seat.

13. A back-rest as claimed in Claim 12, wherein the mounting is provided with rollers adapted to roll along the upwardly extending members to facilitate vertical displacement of the mounting relatively to said upwardly extending members.

14. A back-rest as claimed in Claim 1 or in any one of Claims 3 to 13, wherein the support member comprises a transverse ele-

ment to which are articulated spaced supporting elements along the length of said transverse element.

15. In or for use in the back of a seat,  
5 a back-rest substantially as hereinbefore described with reference to any one of the em-

bodiments described in the accompanying drawings.

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Fig. 1

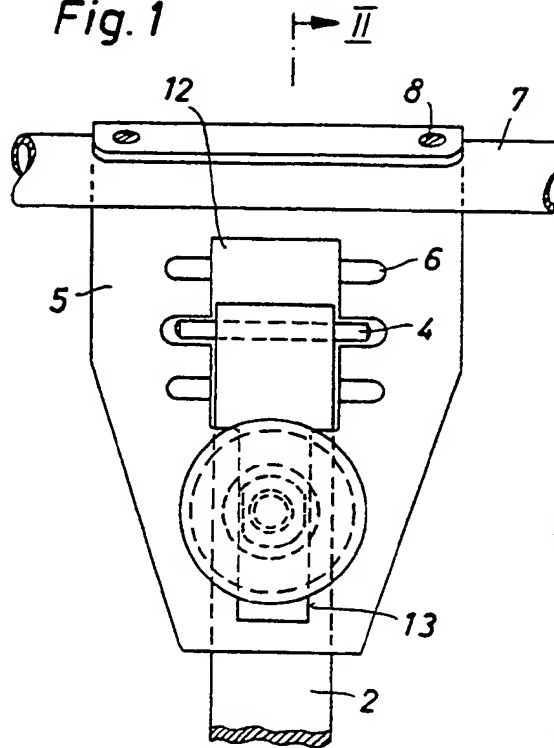
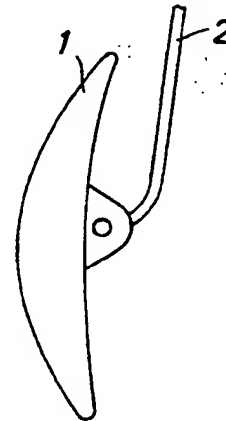
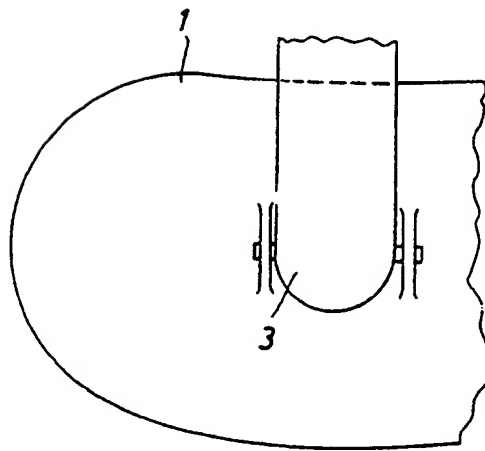
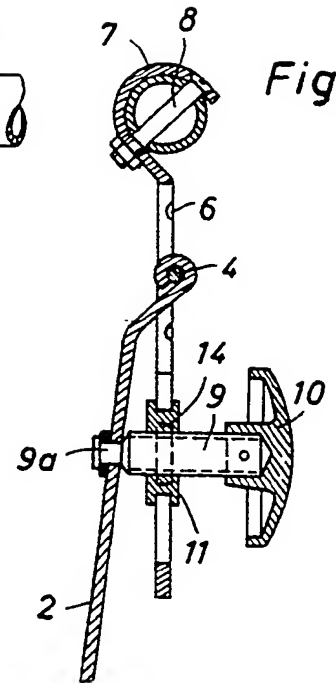


Fig. 2



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COMPLETE SPECIFICATION

4 SHEETS

This drawing is a reproduction of  
the Original on a reduced scale.  
SHEETS 1 & 2

